JULY 1974

CQ TV

THE JOURNAL OF
THE BRITISH AMATEUR
TELEVISION CLUB.

No 87

25p

THE BRITISH AMATEUR TELEVISION CLUB

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WHO TO WRITE TO

New Membership enquiries only should be addressed to Gordon Sharpley G6LEE/T, the Membership Secretary. Subscriptions and changes of address should be sent to Alan Pratt, the Treasurer. Please only address enquiries to the committee member most suitable.

C Q - T V is published quarterly by the British Amateur Television Club and is posted free to all members. Single copies are available from the Editor at 25p each; back numbers are also available to members at reduced prices.

Overseas members may have their copy of C Q - T V sent by air-mail, for a surcharge depending on their country. Details are available from the Treasurer.

Members wishing to have material published in C Q - T V should send the manuscript and drawings to the Editor; articles are invited on all subjects of interest to amateurs and should be of about 1500 words; larger articles should be divided into convenient parts for publication in consecutive issues of the journal.

THE EDITOR

Andrew Hughes, 93 Fleetside, West Molesey, Surrey. KT8 0NQ Tel. 01-979 9983

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EDITORIAL

May I first apologise to those contributors who have had to wait so long to see their articles in print. There has been so much pressure on space recently that each time publication date has arrived the decision has had to be made as to what must be left out. These are odious decisions for any editor to make; I hope I have not offended anyone too much.

The price list for Club Sales shows one change in this issue; the cost of a vidicon yoke has risen to £9.00 Inflation is one of today's tribulations and B.A.T.C. unfortunately has no choice but to accept those rises which are presented to it. All one can say is that the yokes we offer today are the very best we can aquire and hopefully, those of you who purchase will be quite happy.

Just one last point; please read the 1974 Convention News and decide to come to Rugby in September. As many of us as possible ought to meet up once in a while.

THE EDITOR

POSTBAG

Christopher Carr G6AEB/T at present employed by the GPO in Zambia has, together with some of his colleagues, become very interested in SSTV and hope to come on the air some time. Lets hope we see you soon!

H.B. Burton G2JR as reported in the recent newsletter, has been authorised to use the 80m band for SSTV transmissions by the M.P.T. (now the Home Office). During June whilst on holiday in Norway, 'JR took his monitor and tape recorder with him as he had received permits to operate fixed and mobile in Norway and Sweden. Hope this gave you some nice qso's! As a correction to an earlier postbag item, he has not yet got his FSS and SSTV camera into operation - but hopes it would not be too long.

Hastings District Council will be holding an exhibition in November 1974 to commemorate the 50th aniversary of J.L. Baird's demonstration of tv at Hastings in 1924. The exhibition, if sufficient support is forthcoming, would have an historical theme and, to this end, they are trying to find owners of early televisions and similar appartus that would be prepared to demonstrate at, or loan to, the exhibition which is envisaged at the moment to last several days. Anyone who could assist in this way, or who cou mount a demonstration of Amateur Television at the exhibition is asked to contact R.T. Holder G8CFZ of 13 Essended Rd., St. Leonards on Sea, Sussex.

The Pakistan Amateur Radio Society was established in February 1974 and has applied to IARU for membership. Ahmed Ebrahim sends this message on behalf of the Society. "May I on behalf of all the members of our Society extend our warmest greetings to all the members of B.A.T.C. The Society address (especially for QSL Bureau) is PO Box 65, Lahore, Pakistan." I am sure members of B.A.T.C. would like to thank Mr. Ebrahim for his greetings and welcome the new organisation to the fold.

Ron Johnson G3GRJ From Waltham Cross is interested in Slow Scan (only sstv, he says - shame!) and has built a signal generator frm HAM RADIO. With additional pattern facilities, and also the Spacemark Monitor. This latter he thinks has a very confusing maual; many other people have made similar remarks. Perhaps a re-write is called for.

M.A. Valente in Glasgow seems grateful for the article in C Q - T V No. 85 explaining how to reduce the cost of the SM0BUO slow scan monitor - he is now building it! As he is also building the FSS from C Q - T V No.81 he should have a good rig soon. Fast scan facilities include a 405 line vidicon.

John Standen G4BSU at present at PO Box 3843, Riyadh, Saudi Arabia wants to try underwater television from a boat and is looking for advice. As 300ft of cable is envisaged, only video out and say, 12v can be accomodated in the cable, and the camera would need to be small, light and not need much light. Sounds impossible! If anyone has any suggestions, please write.

SLOW SCAN NEWS

Here are the results of the 4th World Slow Scan Contest held on the 9th - 10th February. Congratulations from B.A.T.C. to G3IAD who was placed eleventh.

1.	W9NTP	9,348
2.	WA1NXR	3,344
3.	WA7QBV	2,982
4.	WB4ECE	2,666
5.	IT9ZWS	2,210
6.	HB9NL	2,108
7.	WA1KYV	2,046
8.	EA4DT	1,998
9.	EA4JF	1,862
10.	DK5EL	1,786
11.	G3IAD	1,617
12.	HA6VK	1,224
13.	I0PCB	1,078
14.	IT9ZDA	988
15.	CT1PG	936
16.	I1PXC	897
17.	OZ1AT	858
18.	I3HDC	525
19.	K9BTU	480
20.	JA1ARA	406
21.	JA7FS	290
22.	VE6SL	187
23.	IS0PEM	153
24.	OZ2YC	Control Log
25.	SM0CQV	Control Log

Letters to the Editor

Dear Sir,

I was very interested in the "Progress Report on L.D.T.V." in the May 1974 issue of C Q - T V as I believe I

continued on page 35

atv contest news

NATIONAL AMATEUR TELEVISION CONTEST 1974 - RESULTS

Section A

POSITION	CALL SIGN	POINTS	No of CONTACTS	BEST DX	QRB(km)
1	G6KQJ/T	1464	19	GW6AGR/T	110
2	G6ACR/T	732	8	GW6AGR/T	130
3	G6AHJ/T	682	9	G8HNN/P	58
4	G6AGT/T	234	4	GW6AGR/T	90
5	G6ADS/T	164	8	G6GDR/T	18.5
6	G6AEC/T	160	3	GW6AGR/T	42
7	G6AJL/T	136	7	G6AGG/T	18
8	G6AJP/T	134	7	G6AGG/T	20
9	G6AJN/T	120	6	G6AGG/T	24
10	G6AHK/T	7	1	G6AHE/T	3.5

....

Section B

1	GW6AGR/T	1820	9	G6KQJ/T	110

....

Section C

1	G8HNN/T	665	10	G6AIE/T	102

....

Although there was an increase in entries this year the total remains disappointing small. Certificates of Merit to the leading stations in each section.

INTERNATIONAL AMATEUR TELEVISION CONTEST - 1974

Organised by B.A.T.C., AGAF and ATA.

When: 1900-2300GMT on 14th September SESSION 1
0800-1200GMT on 15th September SESSION 2

Eligible Entrants: All amateurs licenced to transmit and/or receive amatuer television. All entrants must operate strictly within the terms of their licence.

There will be three sections:-

A. FIXED OR /A STATIONS

B. PORTABLE

C. LICENCED STATIONS (OTHER THAN /T LICENCEES) WHO CAN TRANSMIT SOUND ONLY AND RECEIVE VIDEO.

FREQUENCIES AND MODES:

a) SOUND on 144,432 or 1296 MHz A3,F3,A3H or A3J

b) VISION on 432 or 1296 MHz A5 only.

CONTEST EXCHANGE shall consist of:

1) Call sign
2) Vision signal report based on the B.A.T.C. reporting chart 0-5
3) Serial number which shall start at 001 and increase by one per contact throughout the entire contest.
4) QTH(QRA) Locator
5) QTH
6) A code group of FOUR non-consecutive numbers (eg 5397) which must be sent by vision only. The code group must be changed for each session of the contest.

SCORING : Stations entering Section A or B score at 2 points per kilometre.
Stations entering Section C score at 1 point per kilometre.

A multiplier of 6 should be applied to all contacts on 1296 MHz band. Incomplete or one way contacts should be claimed and will be allowed at the adjudicators discretion.

All logs which should preferably be on B.A.T.C. contest sheets should be sent to the Adjudicator, 10 Pilgrim Road, Droitwich, Worcestershire WR9 8QA postmarked not later than 4th October 1974. B.A.T.C. contest log sheets are obtainable from the above address. Please include a large SAE.

1974 BATC Convention.

THE DATE Saturday September 28th 1974

THE TIME 10.30 to 18.30

THE PLACE The Benn Memorial Hall, Newbold Road, Rugby.

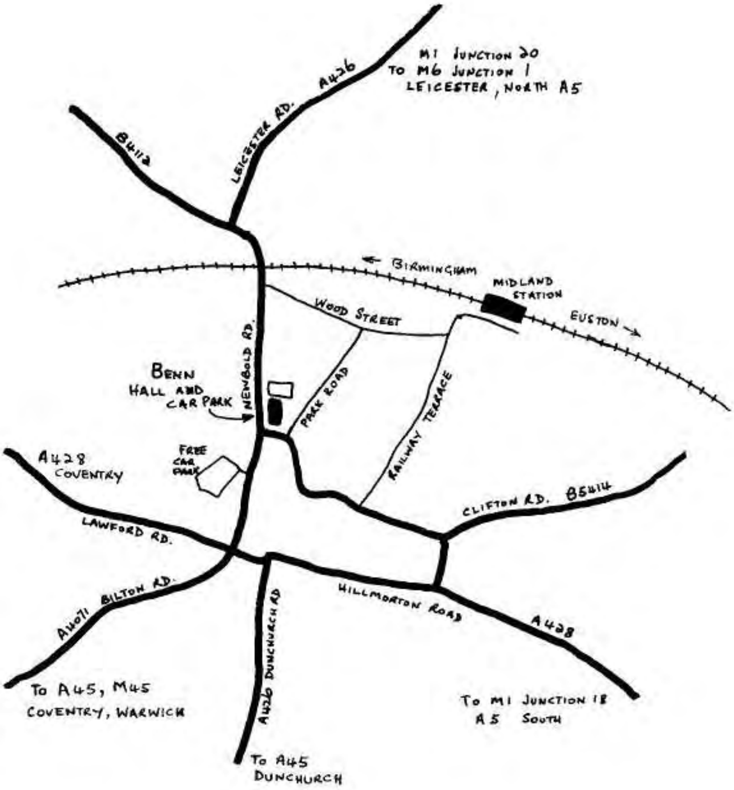
The Benn Memorial Hall is ajoining the Rugby Town Hall and the photograph shows the view as the Hall is approached by the road from the M6 Exit 1 and the M2 Exit 20 when approaching from the Midlands or the North.

There is ample free car parking space, but please do not park in front of the Hall. Unloading facilities are available adjacent to the rear entrance for equipment to be unloaded and brought in for display.

For those travelling by British Railways the Hall is approximately 10 minutes walk from the station. Trains come from Euston (every hour), Birmingham, Liverpool, Manchester, Preston, Carlisle, Glasgow etc., and a day return ticket is the cheapest way to travel (£2.10 from Euston). If you intend to bring gear by Rail to exhibit at the Convention let Lewis Elmer know during the week proir to the Convention and he will try to lay on transport to save you carrying it from the station . His phone number is West Haddon 324 (STD 078-887), and if he is not in leave your name and time of arrival at Rugby Station on the Ansaphone.

IF IN DOUBT ASK FOR THE TOWN HALL

In the event of inclement weather those arriving by rail are invited to phone the Benn Memorial Hall (Rugby 5321) upon arrival at the station. If at all possible transport will then be organised to the Hall. Note that the public phone box at the station is ON the platform and not outside the station.



CONVENTION PROGRAMME

10.30	Convention opens
10.30 - 18.00	Exhibition of members equipment
14.15	B.A.T.C. Bi-annual General Meeting
16.00	Discussion groups
18.30	Close of Convention

Light refreshment will be available in the Hall.

Members are required to advise Mike Crampton, 16 Percival Road, Rugby (Tel. Rugby 73276 STD 0788) of their table space and power requirements in advance so that he can save you a place. Power outlets (3 pin - 13amp) are scarce, so please bring your own distribution panel to help out.

Club publications and sales items will be on sale. The equipment register will be available and you are invited to bring along your surplus tv equipment for sale.

For those members who will be accompanied by their wives, the shops in Rugby are open all day on Saturday. Offers of help from visiting wives to assist in the preparation and distribution of the light refreshments in the Hall would be most welcome.

CONVENTION DINNER At the time of going to press only half a dozen or so members have expressed any interest in attending a dinner in the evening. If you would like to attend a dinner that evening, please write to the Club Chairman (see page 1 for the address) as soon as you receive this issue of C Q - T V.

Your committee are still willing to try to arrange a dinner but finding a suitable venue will not be easy at such short notice, **so** if you write straight away you will be notified prior to the day of the convention if we have been successful. Please state the number of tickets you would require and an indication of the price you would be prepared to pay up to, say £3.00 per head maximum.

BI ANNUAL GENERAL MEETING

PROVISIONAL AGENDA

1. Apologies for absence.
2. Minutes of the previous General Meeting.
3. Treasurer's Report and adoption of the accounts for 1972 and 1973.
4. Treasurer's Report on the current year to date and confirmation of the subscription rate in the light of current and known future costs.
5. Chairman's Report.
6. Resolutions received in writing.
7. Election of Committee Members.
8. Any other business relevant to the retiring committee.
9. Announcement of Constitution of New Committee.
10. Any other business.

This meeting the amended Constitution adopted at the 1972 General Meeting comes into effect (See C Q - T V 80). The Committee members who are retiring and offering themselves for re-election are as follows. M.J. Sparrow, J.J. Rose, G. Sharpley, B. Kennedy, C. Chivers, J. Cunningham, N. Salmon and M. Crampton. The other Committee members remain in office for a further 2 years to ensure continuity.

The Committee would welcome nominations for other members who are prepared to help in the work of running the Club. If you know of someone suitable ask them now if they are prepared to have their name put forward at the General Meeting.

Any member who has a resolution which he wishes to have put forward at the General Meeting must send it in writing beforehand to the Hon Chairman (see page 1 for the address). Such resolutions will then, if necessary, be placed on the agenda for discussion and voting.

View of Benn Memorial Hall as seen from the road.

B.A.T.C. LIBRARY

The following technical mauals are held by Grant Dixon, the B.A.T.C. Librarian (whose address is on page 1). These may be borrowed by members of the Club on a short or long term basis. Large stamped addressed envelopes should be sent with any enquiry.

CAMERAS

Marconi	Monoscope Camera	BD665C/D	T2770/1
Marconi	TV Camera	BD 687	T2904/2
Marconi	Mobile Monoscope Camera	BD 617B	T2918

PULSE GEN. ETC.

Venner Electronics	Double Pulse Generator	TSA 628
Marconi	Studio Vision Mixer	T5479
Marconi	Spike Generator 1879	T2876
Marconi	Sound & Vision RX BD 909A	T2898

INSTRUMENTS

Marconi	Counter/Frequency meter	TF1417	
Advance	Timer/Counter	TC4 & TC1000B	
Advance	Twin Stab. Power supplies	PP3 & PP3R	
Advance	Power Supply	PP10	
Marconi	Electronic Switch (inlay)	T3979/1	
Marconi	Reg. Power supply (BD654L/D; BD641B/C; 5481C)	T2349/3	
Pye	Special Effects Generator	24/2	
Marconi	V.D.A. BD886B	T4161/1	
Marconi	Image Orthicon Power supply 3394A	T3770/2	
Cintel	Multiplexed F.S.S. Equipment		
Marconi	Test Oscillograph BD803/A (valves)	T2970/1	
Marconi	Waveform Monitor BD810	T2671	
E.M.I.	V.D.A. 249	TL1117	
E.M.I.	Pulse D.A. 252	TL1323	
E.M.I.	Line Selector type 1 & /A		
E.M.I.	Stab. power supply	845	T11499
Peter Scott	Distribution Amp.	TB902/2 903/2	
E.M.I.	Synce Generator	22698	TL 1376
E.M.I.	Isolating Amp.	246	TL1084
Marconi	Line Clamp Amp.	BD813A/B	T2802
Marconi	Line Clamp Amp.	BD921	T4062
Marconi	Cruciform Generator	Type 1878	T2875
Marconi	Gating Generator	BD659	T2451
Pye	Mantage Unit	2409	
Standard Telephones	625 line Transmitters 131C/D		

MONITORS

Rediffusion	Video Monitor	VM1002	Dual Standard
Peter Scott	Video Monitor	TB204/A	Triple Standard
Peter Scott	Video Monitor	TB1201/2/3	Triple Standard
Cintel	Video Monitor	28840	(valves) Triple Standard
Marconi	Video Monitor	(BD819 14" BD840 17")	T2839
Cintel	Video Monitor	17" Gen. purpose	
E.M.I.	Video Monitor	301	TL1092
Pye	Video Monitor	2823	
Pye	Transistorised Picture Monitor 842843, 842844, 842845		

A TRANSISTORISED EHT UNIT

Dave Seaward G8DJM

This unit was intended for use in a slow scan monitor, but could be used for other items requiring eht. It consists of a multivibrator driving a tv type switching transistor into a modified tv line output transformer. The circuit is quite straight forward and drives the transformer with square waves of about 10 - 15 KHz depending upon transformer type.

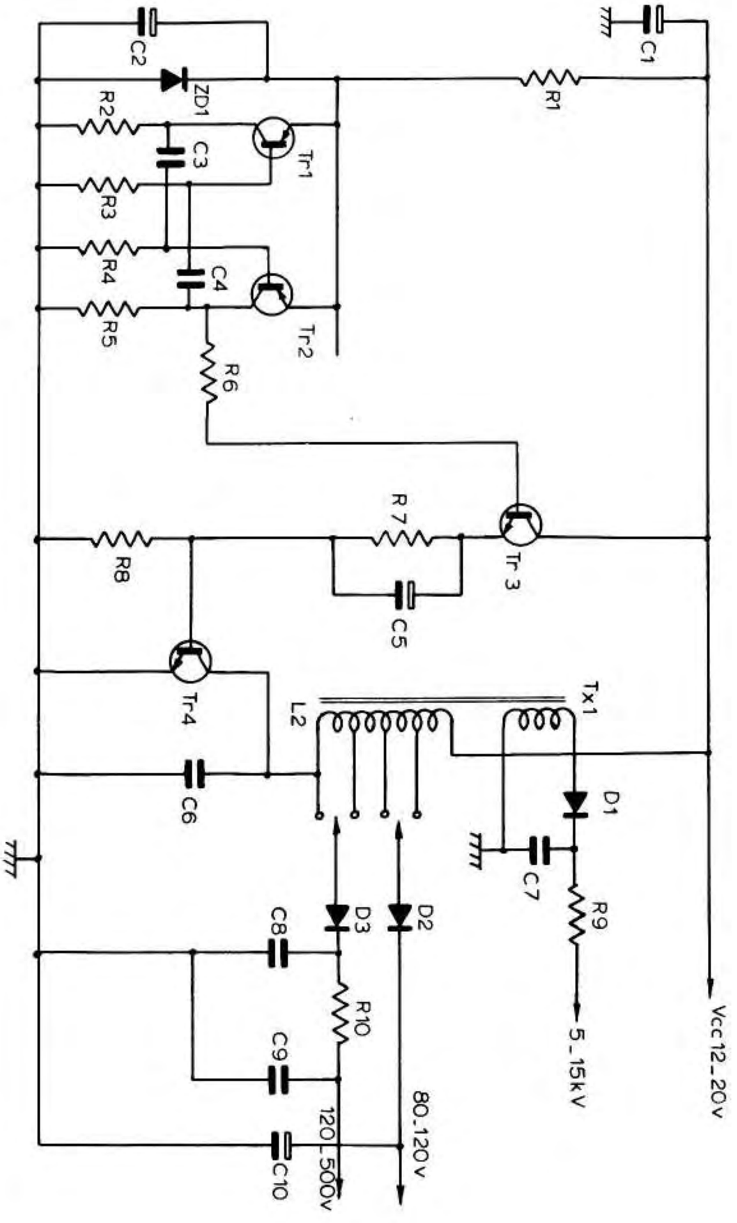
EHT VOLTAGE DEPENDANT ITEMS

1. Supply voltage to output transistor. In a switching circuit the transistor is switched on hard, so output voltage depends on input voltage.
2. Frequency of switching. This will in practice depend upon the design frequency of the transformer used.
3. The gap between the halves of the ferrite core of the transformer. This affects the efficiency of the circuit.

Firstly select a transformer. The older 405 line types were for 10 KHz only, modern 625 types for 15 KHz only and intermediate types for both frequencies.

Secondly, carefully dismantle the transformer into its component parts. Some newer types are sealed with resin, and are useless for this unit. Now put the large eht overwind on one side. Next remove all the wire from the primary winding, and the easiest way to achieve this is to cut the whole winding with a saw. Now wind the new primary onto the former. The reason for all the taps is to obtain various secondary voltages for use in the monitor circuitry (tube electrodes, electronics etc.). This winding must be phased when the unit is working. To do this, re-assemble all the parts and connect one end of the new primary to the supply, the other end to the output transistor collector and leave all the taps disconnected. With the drive and eht rectifier connected, measure the eht voltage. Then transpose the primary connections, and use the primary connection which gives the most rectified eht.

One point that should be mentioned at this stage is that you are dealing with a circuit in which the transformer is made to ring at usually the third harmonic of the input frequency. Therefore the peak voltage will be a lot higher than the mean level.


C1
C2
ZD1
R1
R2
C3
Tr1
R3
R4
C4
R5
Tr2
R6
R 7
Tr 3
C5
R8
Tr4
L2
Tx1
C6
D1
C7
R9
D3
D2
C8
R10
C9
C10
Vcc 12_20v
5_15kV
80_120v
120_500v

On the point of the transformer gap it is probably best to leave a small one. Do this by sticking small pieces of paper to the faces of the ferite before assembly. If the transformer rings erratically, alter this gap to get an even ring.

Do not try to use any other typ of transistor in the output as the peak voltage across this is of the order of 400 volts.

The final eht voltage can be adjusted by varying the supply voltage. Always start low and build up. Ehts of up to 15Kv can be obtained without the use of voltage doubling or tripling circuits, so mind your fingers. This may be the last slow scan circuit you work on! This type of supply is, however, much safer than those using mains transformers, which should be avoided at all costs.

R1	1K Depends on Vcc
R2	1K
R3	5K6
R4	5K6
R5	1K
R6	470
R7	33
R8	2K2
R9	47K
R10	100K
C1	100uF 25v
C2	100uF 10v
C3	0.01uF at 15KHz or 0.02uF at 10KHz
C4	0.01uF at 15KHz or 0.02uF at 10KHz
C5	4.7uF 10v
C6	2200pf 600v

C7	100pf 12Kv
C8	0.2uF 600v
C9	0.2uF 600v
C10	4.7uF 150v
ZD1	5volt Zener
TR1	BC177, BC186 etc.
TR2	BC177, BC186 etc.
TR3	BFY51, BFX84 etc. require heatsinks
TR4	BU105, R2008
D1	BY176, BY182
D2	IN4007
D3	IN4007, BYX10
L1	original eht overwind
L2	50 turns over original former, tapped every 10 turns. Use 24 s.w.g. wire. Select voltage taps according to voltage required in use.

IN THE NEXT CQ-TV

A full report on CAT 74.
An experimental low definition tv system.
All the regular articles.

We regret the non-appearance of Arthur Critchley's series on Integrated Circuits in this issue, due to pressure of work on the author. We hope to resume with part 16 in a future issue.

A 70cm Transmitter

by M. J. Dyke G6AHR/T

There have been a number of solid state transmitter designs published in C Q - T V, but not very much information recently on valve equipment. The idea of using valves may seem a little dated, but there is a surplus of valves in circulation! There must be a number of potential operators who are a little hesitant about paying a lot of money for devices which may not work when they have well stocked junk boxes with most of the parts necessary for the design described here.

The design offers nothing new, in fact it has all been done before; but it does bring together a series of ideas to form a fairly compact and functional unti.

CONSTRUCTIONAL

Having manufactured a suitable chassis and front panel, mount all the valve holders, and proceed to wire up the heaters. A pair of twisted wires should be used throughout, being earthed at the power supply only. Each valve heater pin should be de-coupled, using a 1000pf. disc capacitor between pin and chassis.

The various tuning capacitors should next be fitted, followed by the smaller components. Particular attention should be paid to the construction of the modulator section. Component leads should be kept as short as possible, and mounted close to the chassis. As with the exiter section, it is adviseable to use one common earthing point for each stage.

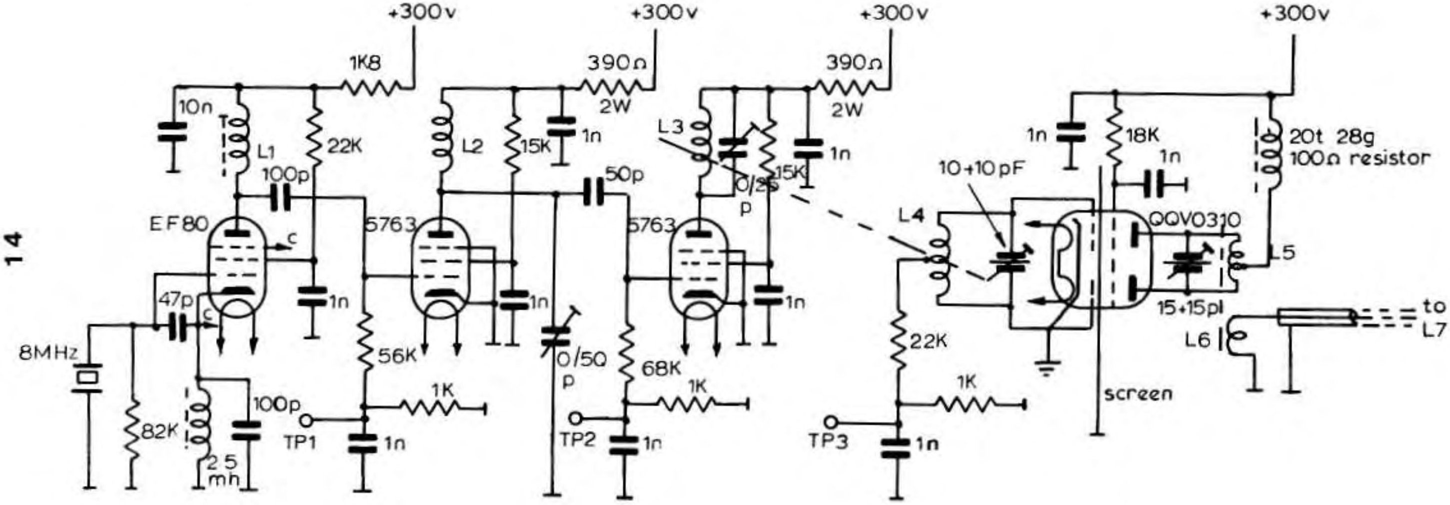
When all construction work has been completed, check any mistakes. After all, ten or so minutes checking can save hours of repairing.

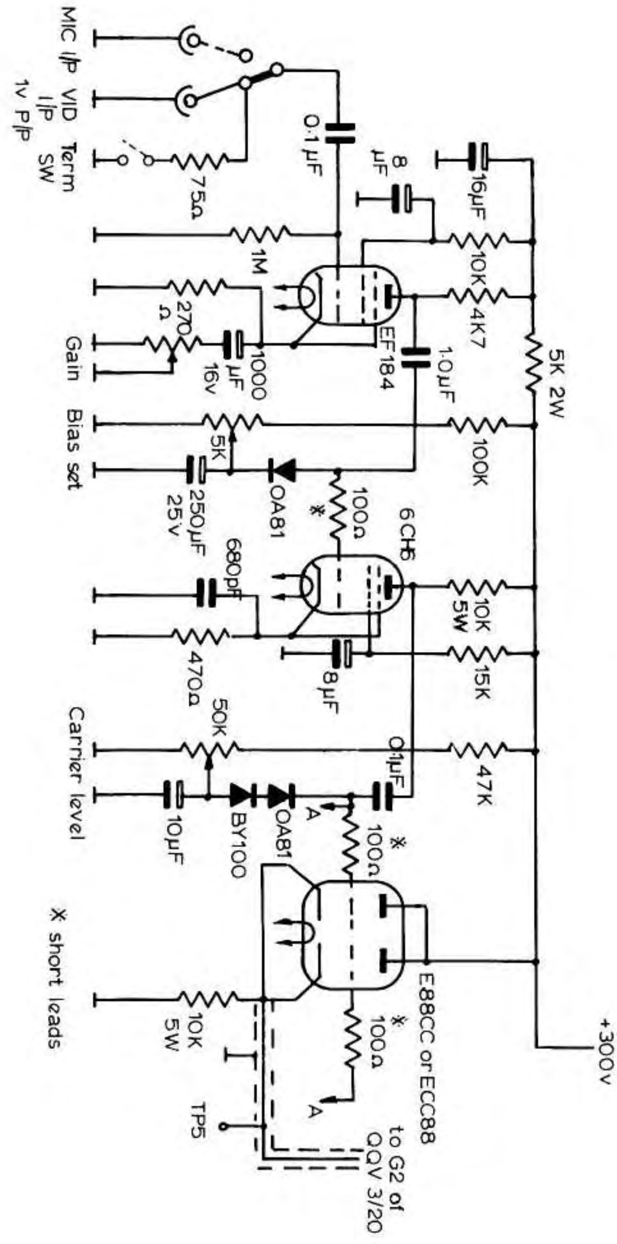
LINING UP

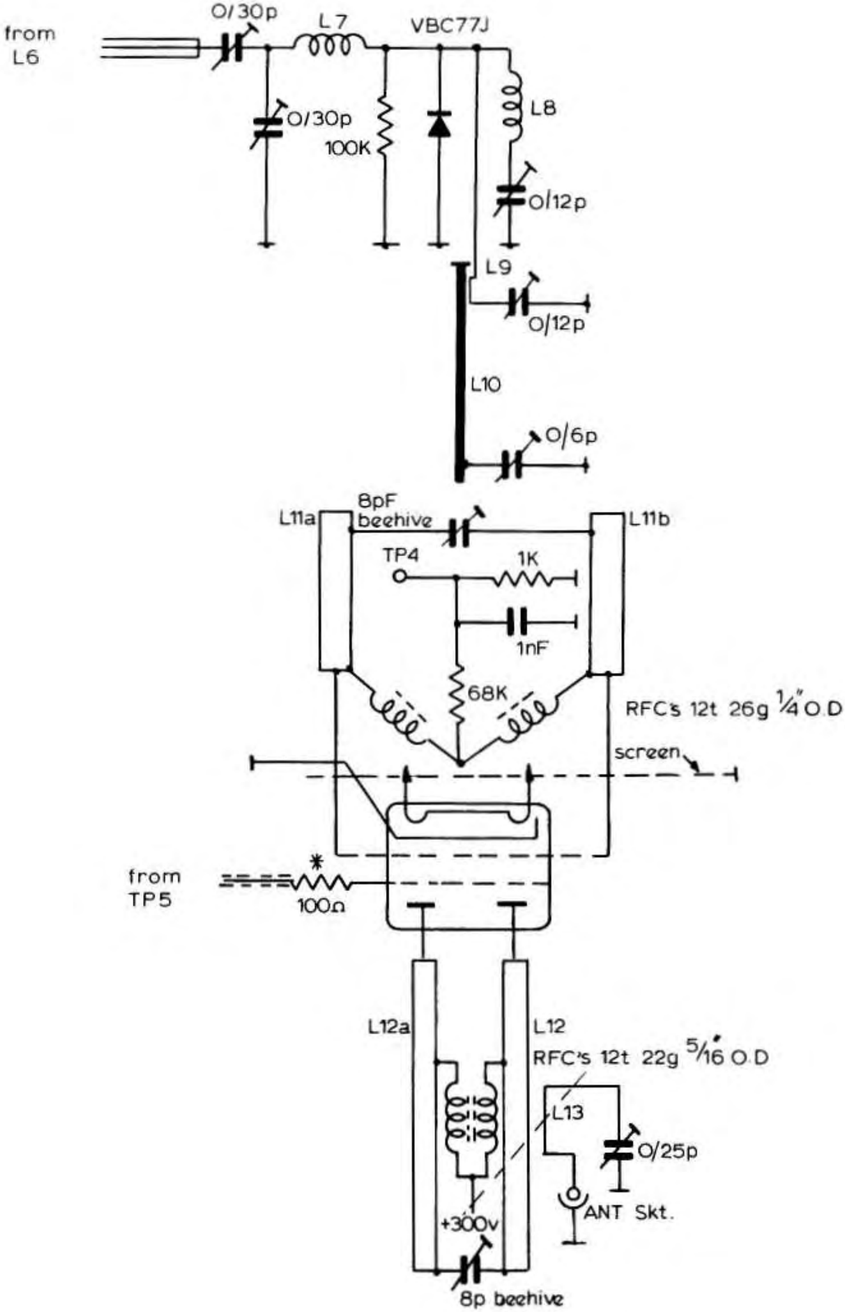
Remove HT from all stages except for the oscillator. Plug in the crystal to be used, (8 or 12MHz) and monitor coil L1 with GDO or wavemeter. This coil should be tuned to 24MHz. Depending on the slug and former used, this coil may have to be padded with a small parallel capacitor.

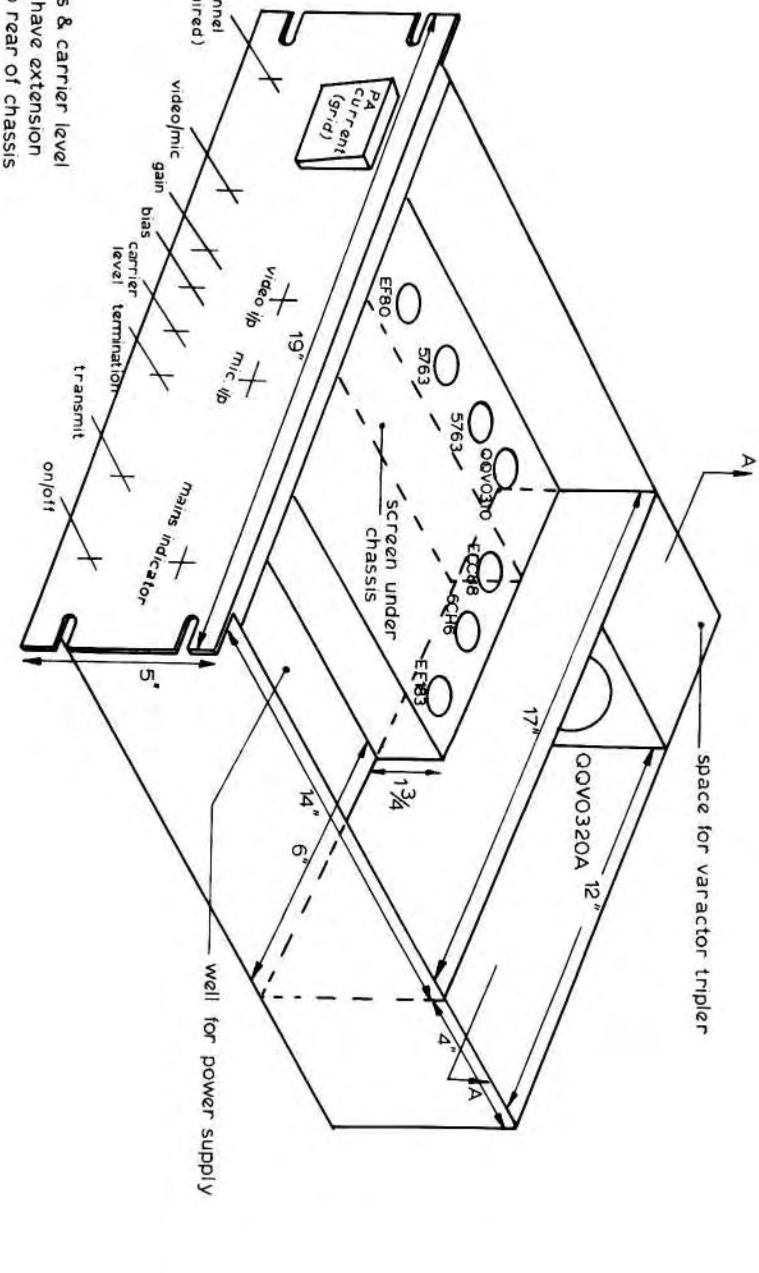
Reconnect HT to second stage, and monitor TP1. A typical reading should be in the order of ¾ - 1mA. Tune L2 to 72MHz.

Connect HT to third stage, and monitor TP2. Trim L2 to give 1¼ - 1½mA. Tune L3 to 144MHz.


+300v
+300v
+300v
+300v
1K8
390Ω
2W
390Ω
2W
10n
L1
22K
100p
EF80
c
47p
c
8MHz
82K
2.5
mh
100p
TP1
1n
1n
56K
1K
5763
L2
15K
1n
1n
50p
0/50
p
5763
68K
1K
TP2
1n
L3
0/25
p
15K
1n
1n
L4
10+10pF
22K
1K
TP3
1n
1n
18K
1n
QQV0310
L5
20t 28g
100Ω resistor
15+15pF
L6
to
L7
screen

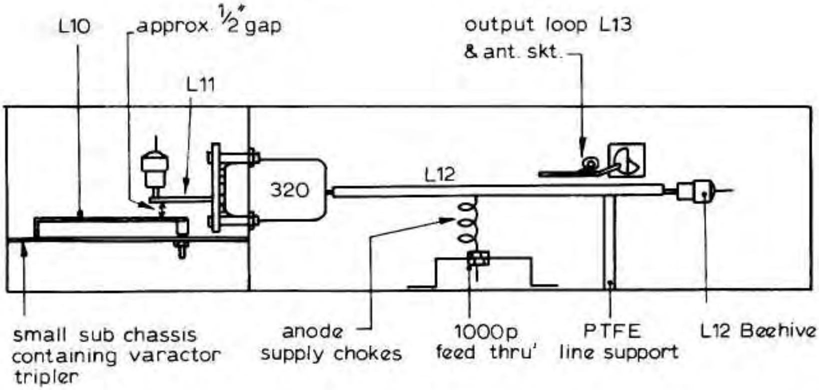

MIC I/P
VID I/P 1v P/P
Term SW
75Ω
0.1μF
8 μF
16μF
1M
10K
4K7
5K 2W
270 Ω
1000 μF 16v
EF184
1.0μF
Gain
Bias set
5K
100K
250μF 25v
OA81
100Ω
*
6CH6
680pF
10K 5W
15K
8μF
470Ω
50K
Carrier level
0.1μF
47K
10μF
BY100
OA81
A
100Ω
*
E88CC or ECC88
10K 5W
100Ω
*
A
TP5
to G2 of QQV 3/20
+300v
* short leads


from L6
0/30p
L7
VBC77J
0/30p
100K
L8
0/12p
L9
0/12p
L10
0/6p
L11a
8pF beehive
L11b
TP4
1K
1nF
68K
RFC's 12t 26g 1/4" O.D
screen
from TP5
*
100Ω
L12a
L12
RFC's 12t 22g 5/16" O.D
L13
0/25p
ANT Skt.
+300v
8p beehive



Gain, bias & carrier level
controls have extension
spindle to rear of chassis

Section A.A



Apply HT to the 310 amplifier, and monitor TP3. Tune L4 to maximum grid current, also trimming L3. Current at TP3 should read 3 - 4mA.

Tune L5 to 144MHz, and check DC input to the 310, which should be in the order of 14 - 16 watts.

L6 should be located in the centre of L5, about half-way in. Adjust the two 30pf input capacitors to the varactor tripler to provide maximum 144MHz at L7. L8 should be resonated at 288MHz bythe 12p series capacitor. A 432MHz wavemeter should be located close to L10, and its 6p tuning capacitor adjusted until a deflection is noted. L9 is then tuned for an increase in output. The input, and the 288MHz tuning capacitors should be repeaked for maximum output at 432MHz, and a final peak should be given to L5.

The unit should not be run in its present state for too long, as there is no output load on the varactor tripler, and the diode may overheat. Connect HT to the 320 amplifier, and check that there is no more than 10 volts at TP5. Monitor TP4, and tune L11 a/b to 432MHz. 2½mA grid current should be observed. Some small adjustment may be required to L10 tuning capacitor.

When one is satisfied that all is in order, monitor TP5, and with a suitable dummy load in the antenna socket, advance the carrier level pot to read 150 volts. L12 a/b should then be tuned to 432MHz. L13 is then tuned to match the output load. The supply chokes should be carefully adjusted along L12 a/b for maximum output. Rotating the carrier level pot from min. to max. should give a smooth increase in output.

A video signal should now be applied to the input socket, terminated as required, and the carrier level pot turned to minimum. On reciept of the signal, the voltage at TP5 should rise to approximately 120 - 150 volts, with the bias and gain controls set for optimum. Using an ordinary voltmeter at TP5, the results will only serve as a guide, as the signals are at video frequency.

When monitoring off-air signals, RF observed getting into the modulator is usually cured by decoupling the PA or exiter stages with a 8mfd capacitor in parallel with a .1mfd.

Speach modulation is effected by switching to mic, I/P, and rotating the carrier level pot to near maximum. The applied audio should then swing the PA screen volts up slightly, producing a form of series gate modulation.

CONCLUSION

The transmitter was built as a prime mover for a series of large amplifiers. The output was found to be about 6 watts on peak input. It has been used both in the shack, and under portable conditions. (winner 1973 International ATV Contest, portable section).

Aknowledgements to G6AGT/T, for time spent receiving pictures whilst setting up and air testing.

PARTS LIST

All resistors $\frac{1}{4}$w unless otherwise stated.

L1	20t 24g $\frac{1}{4}$" former and slug. Pad to 24 MHz
L2	6t 18g 5/16" I.D. self supporting
L3	2t 16g $\frac{3}{8}$" I.D. self supporting
L4	2t + 2t 18g 5/16" I.D. self supporting
L5	2t + 2t 16g $\frac{3}{8}$" I.D. self supporting
L6	2t 18g $\frac{3}{8}$" I.D.
L7	6t 18g $\frac{1}{4}$" I.D.
L8	3t 16g $\frac{1}{4}$" I.D. 1 inch long
L9	$1\frac{1}{4}$" 16g coupling link
L10	$\frac{1}{2}$" x 18g strip $4\frac{1}{8}$" long
L11	$\frac{1}{2}$" x 18g strip $1\frac{5}{8}$" long, located over L10 in same plane.
L12	$\frac{1}{4}$" dia copper tube $5\frac{1}{2}$" long, adjust choke tap approximately half way along.
L13	loop $\frac{1}{2}$" x $1\frac{1}{4}$" 14g located above L12.

* These resistors must have short leads and be soldered on the valve base pin.

Other suitable varactors
VBC 99J
BAY 96
BAY 66
IN 4885

A SIMPLE BLACK LEVEL CORRECTOR

By D.J. Taylor G8ARV G6SDB/T

I recently had the good fortune to aquire a couple of small transistor monitors which although compact enough for my purposes suffered from a design fault - they were AC coupled.

The effect on pictures of AC coupling, as old hands will be aware, is a compression of the brightness range of the picture. Night scenes appear much lighter than they should (mean video voltage is small) and bright daylight scenes much dimmer (loss of shadow detail).

Rather than rebuild the video amplifier, which could have meant replacing the whole PC board including timebases, the simple circuit described here was developed.

ORIGINAL CIRCUIT

A simplified original circuit is shown in Fig. 1. The video is coupled via an RC network from the collector of the video to the tube cathode. The video is therefore negative-going and in this case about 30v pp. Variation of brightness is achieved by variation of the mean cathode potential. The CRT grid is at earth potential, but there are blanking pulses coupled to it via a capacitor.

SYNC TIP OR CLAMP?

Either a dc restorer working on sync tips or a back porch clamp could be used to correct for the ac coupling of the video. Both are described in the literature (e.g. Amos & Birkinshaw - Television Engineering). Unfortunately, neither can be directly used here as the ratio of load impedance (due to CRT) to source impedance (5.6K) is too low.

SOLUTION

The idea that occured to me is illustrated in Fig. 2. If the video signal is ac coupled to a peak rectifying circuit, then as long as the rectified current is small the voltage level of sync tips at x will follow the voltage level of sync tips at the CRT cathode. Hence point x and the CRT cathode are at a fixed dc.level relative to each other. If we then measure the sync tip potential by a peak rectifying circuit and apply the resulting voltage to the CRT grid we will be effectively maintaining the CRT grid cathode potential constant at sync tip level.

Hence if the sync amplitude is constant we have effectively stabilised black level.

Fig.1. Original monitor circuit

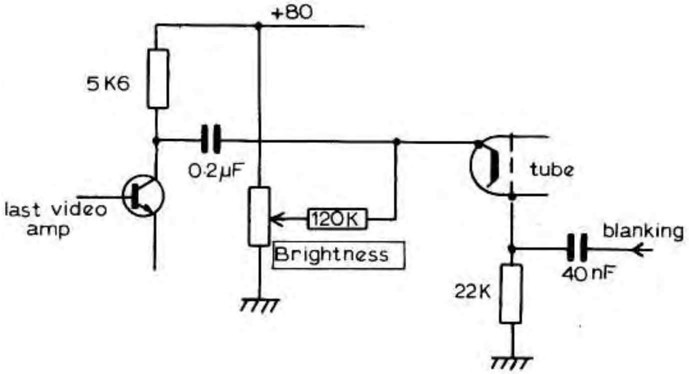
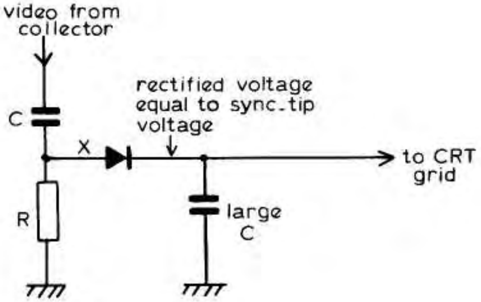


Fig. 2. _ Idea



BASIC CIRCUIT

The basic circuit is shown in Fig. 3. The input time constant C2 R2 is chosen to be the same as that of the cathode coupling of the CRT, but is adjusted on test for least picture disturbance on an LF transition by varying C2.

The current flow in the peak rectifier is kept to a minimum by using a transistor. The voltage developed across C2 is applied to the earthy end of the CRT grid feed resistor.

D1 should be a low capacitance diode and D2 a fast switching diode.

The input filter C1 R1 is provided to reduce H.F. loading on the video amplifier and reduce the effects of any deliberately introduced "ringing". The transistor should be a high voltage type (rated at 40 - 50v). In the prototype a rixie driver was used as the supply was about 80v.

Fig.3-Basic circuit

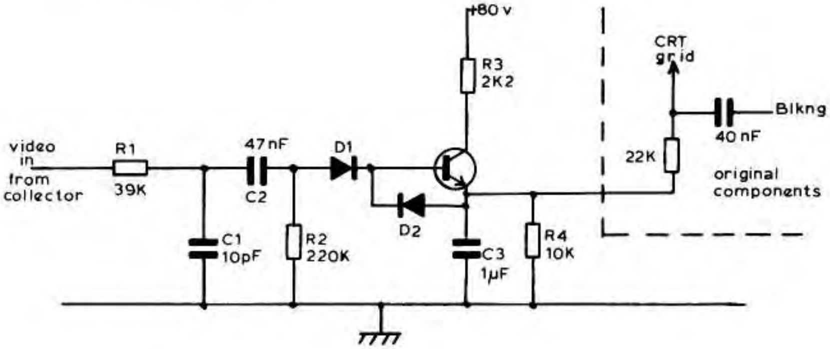
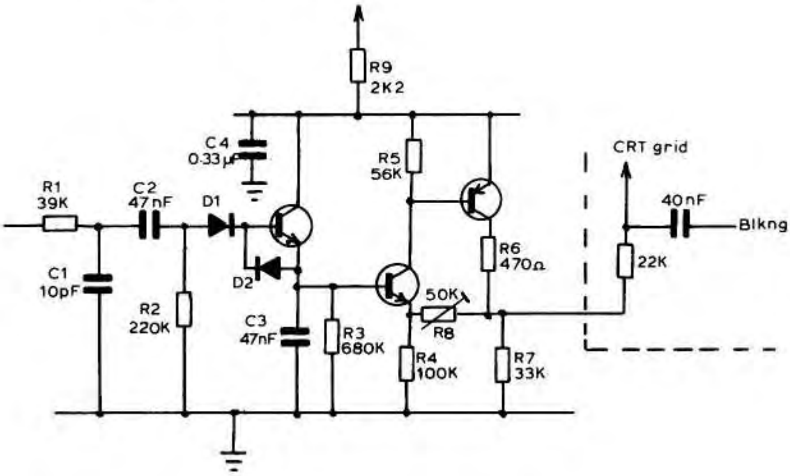


Fig.4. Amplified Corrector



DISADVANTAGES OF THE BASIC CIRCUIT

The assumption inplicit in the basic circuit that the average level at the CRT cathode is constant is incorrect because one must allow for the beam current of the tube flowing through the cathode feed resistor.

In practice this means that slightly more correction must be applied at high brightness levels, and thus the circuit of Fig. 4 was developed.

Here we include a dc amplifier to increase the correction potential and take advantage of the resulting feedback to reduce the current consumption of the circuit whilst maintaining a low output impedance. The preset is set for best results. With this circuit it is possible to overcorrect - resulting in super blacker than blacks and whiter than whites!

RESULTS

Whilst neither circuit is perfect both result in a worthwhile improvement and are quite simple, no critical timing of clamp pulses being required.

A UHF VIDEO MODULATOR

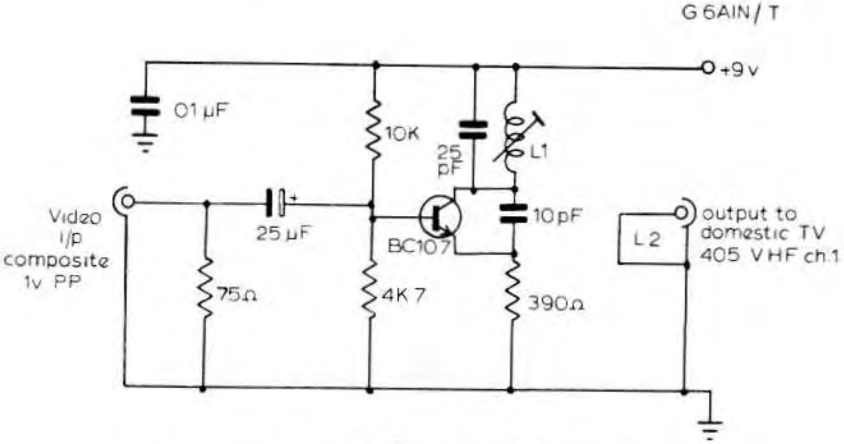
By P.E. Francis G6AIN/T

FOR VHF 405 LINE CHANNEL 1.

Due to the failure of second hand monitors, the author was forced to try using a domestic set. Results were disappointing despite using preamps to feed the video output valve. It was decided to build a modulator to feed the composite video signal from a Beulah D80 camera into the aerial socket of a small television receiver fitted with a Thorn 980 chassis.

A circuit was drawn up and tried with very good results. Referring to the circuit diagram, no problems should arise, the only real point to watch being the positioning of L2. L2

Circuit diagram video modulator for VHF ch 1



L1 = 15T Litz wire on 3/16 former with ferrite slug
L2 see text

consists of approximately 1½" of wire across the output socket and in a position about 1" away from L1. On testing the unit using a test card with frequency gratings, vary the relative position of L2 until the signal received on the television is free from ghosting but not so far away as to cause a noisy result.

On test using a copy of test card 'F' 6" x 4" about 18" away from the camera lit by a 30 watt light fitting, it was found that all the frequency gratings were visible although the response at 5.25 MHz was very much down.

The circuit could easily be accomodated into a tobacco tin or even in a spare space in the camera if desired.

Using this method of monitoring means once the receiver has been correctly set on a broadcast transmission for linearity width etc., it is a very simple matter to check out the camera for any defects in this region and to check that it is on 405 lines.

The power supply was a battery as this was the most convenient at the time, but the circuit could quite easily be powered from the camera itself though the unit may need inverting and the termination resistor reinverted. This has not been tried but for those with negative H.T. rails it is worth a try.

NOTES ON SSTV MONITORS.

NOTES ON THE G3RHI SLOW SCAN MONITOR

By G.L. Sharpley G3LEE

Many members have built, or are building, the slow scan monitor described by G3RHI in the B.A.T.C. slow scan booklet.

The following notes are some observations and modifications which may be of help to constructors.

TIMEBASES

The timebases as described require synchronising pulses to drive them before the spot is deflected vertically or horizontally. In the absence of sync pulses the spot will be stationary so turn up the brightness control carefully. If you see only a diffuse blue glow on the screen the spot is probably off one side so turn the brightness down before proceeding further. The phosphor of the 5FP7 tube burns easily.

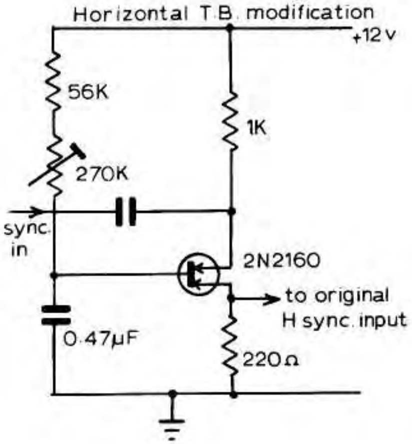
Setting up the synchronising pulse separator circuit needs an oscilloscope and a source of good slow scan signals such as a tape made by someone with a working camera.

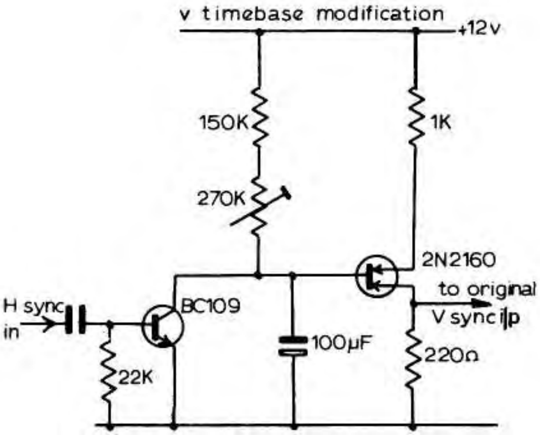
THE ACTION OF THE WIDTH AND SHIFT CONTROLS

The horizontal shift controls the position from which the spot starts from the left hand side of the screen. The width control sets the speed it travels towards the right hand side and hence how far before the next sync pulse. The vertical controls work in a similar fashion. The shift determines the position from which the spot starts at the top of the screen and the height controls the speed it moves towards the bottom.

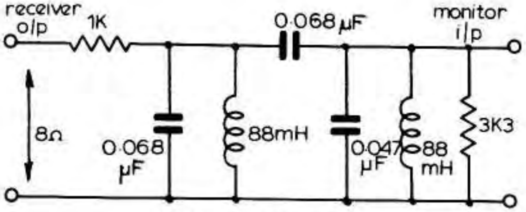
MODIFICATIONS

As mentioned, the timebase circuits, as in the original design, require good incoming sync pulses to trigger them. This can be troublesome, especially in the case of the vertical timebase. If a field sync pulse is missed due to QRM or fading the vertical timebase continues to run and the picture disappears off the bottom of the screen for maybe seven seconds before another good sync pulse comes along, and information which possibly could be read is lost. To overcome this problem I have fitted a circuit to re-trigger the field timebase if a field sync pulse is not received approximately eight seconds after the lase. This enables information to be read even though it may be vertically displaced on the screen. Immediately a good field sync pulse is received the timebase will be set to its correct starting position at the top of the screen. The line timebase is similarly modified, but in this case mainly to provide a certain amount of noise immunity. It will be noticed that in this case the syncs are used to lock a unijunction transistor oscillator and cannot override its action as in the case of the vertical circuit. This much improves the reliability of the line timebase to lock on noisy signals.





Another worthwhile improvement, especially if using the IF bands, is a high pass filter between the receiver and the monitor to reduce the effects of voice QRM. An effective circuit cutting off everything below 1200 Hz due to W3LY is reproduced here.



W3LY Hi_pass filter

NOTES ON THE W4TB SSTV MONITOR

By M.T. Crampton T. Eng. (CEI) A.M.I.M.I.

This monitor was constructed on a 10" x 7" chassis with two printed circuit boards underneath the chassis, the main video and sync circuits being on one board and a 15-0-15 PSU on the other. The tube is mounted on two suitable clamps and the front panel made up to a height of 7½ inches.

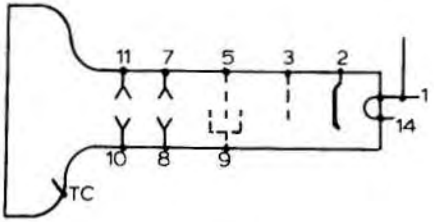
The monitor performs well considering that it cost about £25 to make, buying all new components.

The following notes and modifications may be of use to anyone building this monitor. Some of these modifications have been incorporated in the second edition of the hand-book.

The high voltage power supply and transformer for the low voltage power supply are mounted in a separate 10" x 7" chassis box. This has to be operated several inches from the monitor to avoid magnetism from the transformer affecting the picture.

MONITOR

The value of R1 is increased to 100K.
Back to back diodes are fitted between Pins 2 and 3 on IC1.
88 MHz Toroids can be used for L1 and L2. C5 is then 0.047 and C8 0.22.
The junction of R6 and R5 should be joined to the junction of L1, C5 and C6.
2N718's can be used for transistors Q2 - 6.
The junction of C20 and R37 is joined to the junction of D5, D6 and IC3 Pin 2.
C20 is now a 5 MFD.
An equivalent for D11 (the IN5270 zener) is a IS3091A (91 volt).
A 3FP7 Tube can be used.



3FP7

3FP7 DATA

PIN		
1	6.3v	0.6amps
2	cathode	
3	Grid 1	-60v
4	NC	
5	Anode 1	+575
6	NC	
7	Y1	0.14uuv
8	Y2	
9	Anode 2	+2000v
10	x2	0.1uuv
11	x1	
12	NC	
13	NC	
14	Heater	
CAP	Anode 3	+4000v

PSU

Connect a 2.2K resistor from the collector to the base of the first TIS 98 (Type now changed i.e. the TIS 98 with its base connected through the 2K resistor to Pin 6 of the IC.

Pins 1 and 6 of the I.C. are shown reversed.

The IN5235 is a 6.8 volt zener.

The LT transformer is a 15-0-15v.

For the HT transformer a Heathkit 1,018v oscilloscope transformer type no. 54-503 can be used.

Acknowledgement is given for assistance given during this project by G3YQC (G6AHT/T), G3RDC and G3NDM.

Stolen.

The following equipment was stolen recently from the car of Mr. Roger Coomber. If anyone is able to help with the recovery of this, please contact him at 36 Longfield Crescent, Tadworth, Surrey.

Sony VCR-1 Film chain adaptor
DXC-5000P camera
PVM-400CE monitor
CG-101P sync generator
SEG-200P special effects unit
DR-10 headset
EV320CE VT machine
EVR320 remote control unit
CLP-ICE VT colour unit
CVM-1320UB monitor
plus tripod, tapes and cables.

AN AMATEUR TRIPOD.

by Alan Watson

The purpose of this article describing a Heavy Duty Tripod with Pan-Tilt Head is to try and help people possessing a surplus Broadcast I.O. or Colour Channel and being faced with the problem of maneoverability and stability.

Whilst the description and measurements are based on one actually built and operating, there is no reason why improvements to the basic idea should not be tried and incorporated. The prototype here whilst not pretending to be a Vinten Mk. III etc. at N x £100 which to most amateurs is out of the question, has proved very successful, and has received favourable comments from professional cameramen, and people from the broadcasting industry. This particular unit regularly carries a Pye Mk. III or VIII I.O. complete with Zoom lens, weighing about 1½ cwt. and if the adjustments to be described are carried out a very smooth pan with the minimum of head waggle and a very useful degree of vertical movement above and below the horizontal coupled with good balance can be obtained.

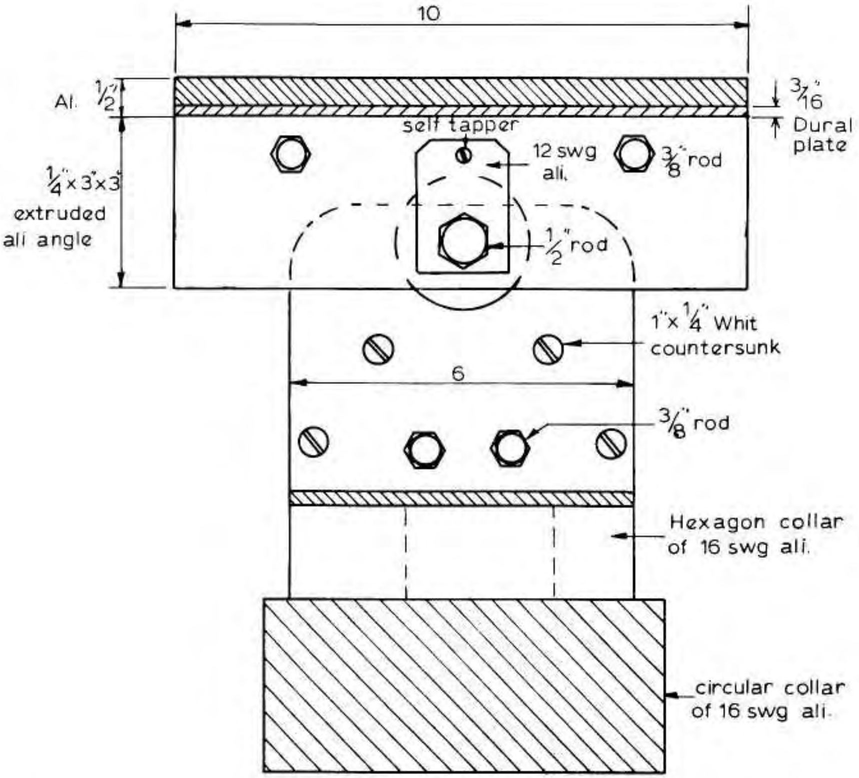
My problem first arose when two 3" I.O.s ex broadcast were suddenly aquired; not knowing quite what to do a police sergeant friend of mine who is very interested in the production side as a hobby decided to help me with the problem. Most of the materials we have used are generally obtainable locally if one is prepared to look around.

Basic tools you will need are a first aid kit, a vice, hack-saw, electric drill + bits; a small home welder could be useful, but if not available a local garage can generally help out.

A wrod of warning: anyone frightened of chopping pieces out of his knuckles of getting sore hands, should not tackle this excercise.

Materials again as specified are only what we used and are not possibly the only thing or the best. This is a basis for ideas so no need to stick rigidly to the formulae.

From the diagrams possibly one of the most difficult things to produce or acquire is the wedge at the top of the Tilt-Head. ½" Dural has been used on one version but on this one I was fortunate in having part of an old Camera head frame, from which I removed the Wedge plate; this was duly hacked straight down the centre (a long laborious job). The two halves were inverted and bolted the correct distance apart as per drawing to the two pieces of a 3" x 3" extruded aluminium angle. Sandwich a piece of solid rolled 3/16" Dural plate (This and two angle pieces were obtained from a local coach and body builders works as offcuts); two simi-

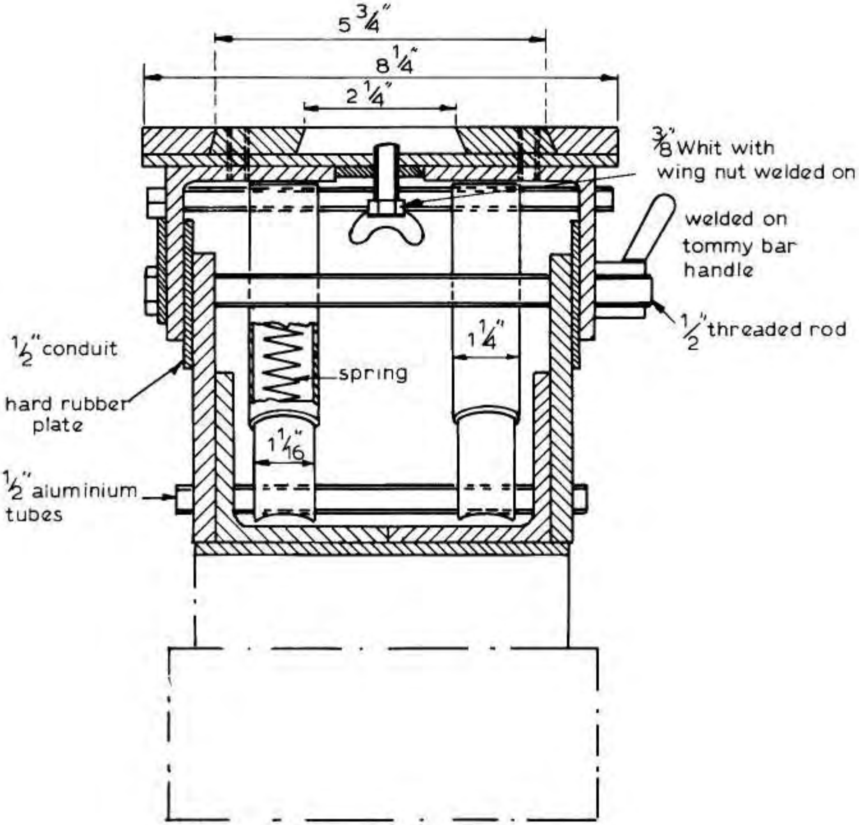


lar bits but shorter are used the other way up at the bottom of the head to which are bolted Vertical extension pieces of ⅜" Alloy sheet, mine were made up of two 3/16" bolted together with a 1" x ¼" Whitworth Countersunk bolts.

These extensions to the bottom are necessary to give sufficient height between top and bottom to enable a good degree of tilt. Similar extensions could be added to the top pieces as well as to increase the tilt still further.

The two sections are then pivoted on a ½" piece of threaded rod, the pivot holes should be drilled as near the edges of the verticals as safely possible; failure to observe this will result in restriction of the tilting angle and difficulty in gaining sufficient movement to the compression tubes. This part of the system was made up of 1¼" and 1.1/16" pieces of motor exhaust pipe section and generally goes up in ⅛" steps, again aquired from the spares section of a local motor engineers, not second-hand of course. From the same suppliers we obtained a box of surplus motor engine valve springs.

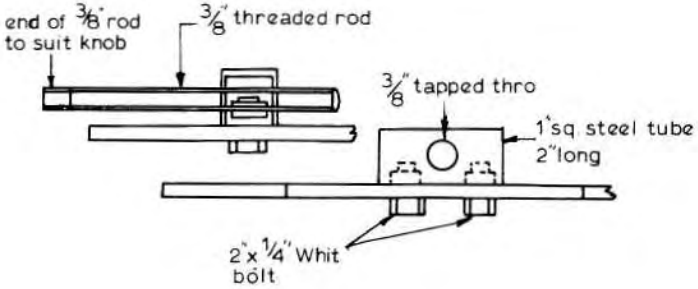
The size of these springs really determined the size of the tubes, but the heavier the spring generally the better. Lengths and numbers that are used in each tube vary according

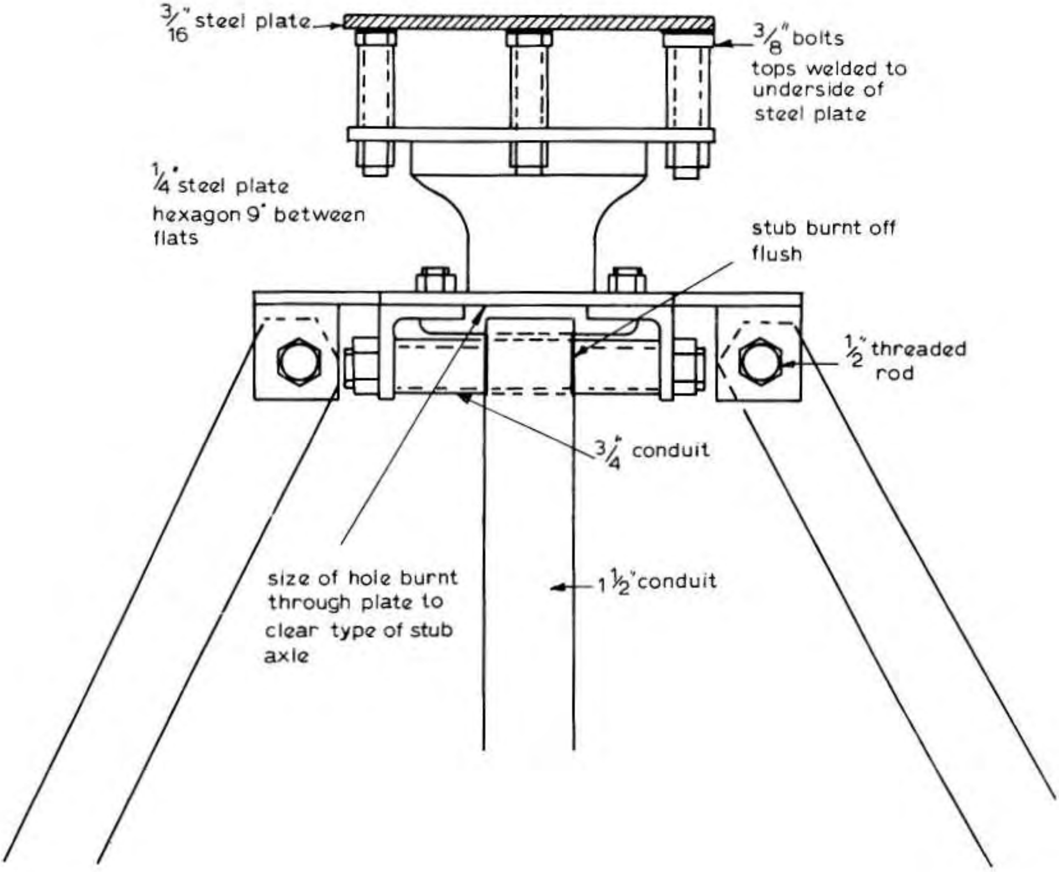


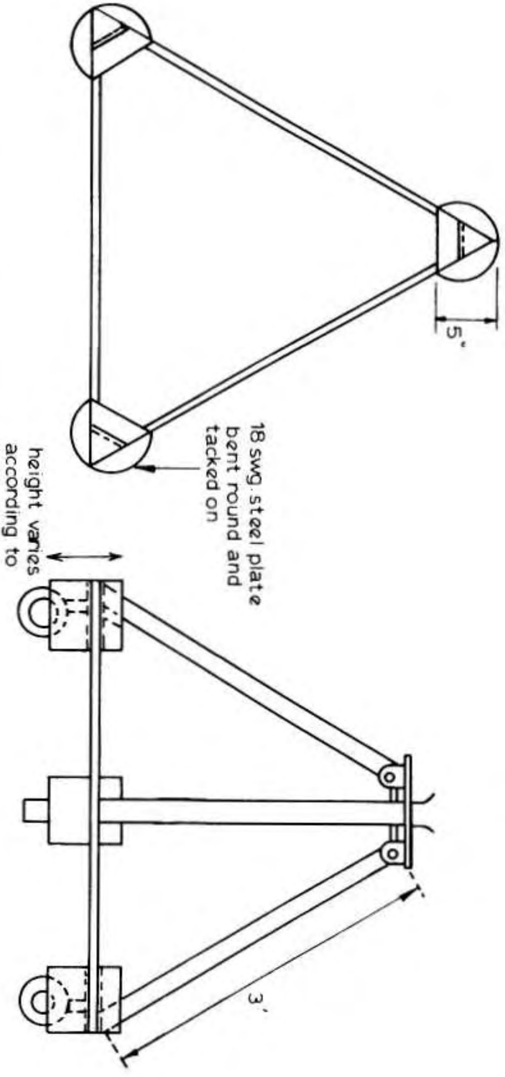
to the lens load but are quite easy to change due to the fact that they are not under tension when the camera is in the horizontal plane. To change or modify the combination one has merely to tilt the camera up and away from the end you are working on. The top rod is then withdrawn (not under tension in this position) and the spring combination changed. For a really heav Camera and lens load Diesel engine springs would be better still.

The next problem we came to was the panning assembly. Various things had been tried but seemed to give from poor to lousey results, other than recourse to expensive engineering facilities, until my policeman friend whilst on patrol one day called in at a car breakers yard and saw them cutting up a vehicle. Suddenly the problem tumbled into place; for 50p and with deft use of an oxy-acetylene cutter, a pair of Ford Consul front wheel stub axles were cut off flush at the axle end. These were complete with brake drum etc. which were not required, so they were removed with a few smart blows from a heavy hammer, after removal of the locating screws.

These were then bolted to a piece of ¼" steel plate - hexagon shaped and 9" between flats, with a hole burnt out of the centre to accomodate the inside of the axle (Often removal of


end of 3/8" rod
to suit knob
3/8" threaded rod
3/8" tapped thro
1" sq. steel tube
2" long
2" x 1/4" Whit
bolt


3/16" steel plate
3/8" bolts
tops welded to
underside of
steel plate
1/4" steel plate
hexagon 9" between
flats
stub burnt off
flush
1/2" threaded
rod
3/4" conduit
size of hole burnt
through plate to
clear type of stub
axle
1 1/2" conduit


5"
18 swg. steel plate bent round and tacked on
height varies according to castors
3'

the pin and locknut and roller race). The four bolts are the same ones that originally held the inside of the drum disc.

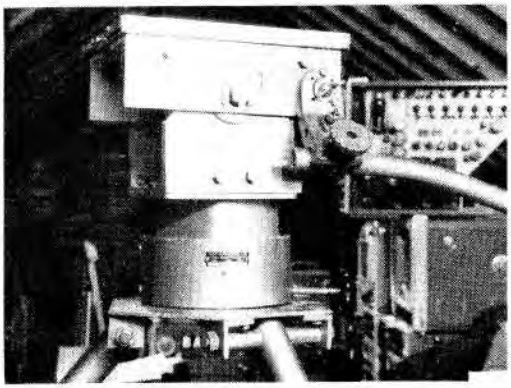
The next job is reassembly of the bearing and outer axle. A point to mention before obtaining this item is to check that there is no noticeable wear whatsoever on the front wheel bearings; failure to observe this could result in unpleasant waggle on the camera, making use of long range lenses out of the question. For the same reason the more solid the 9" plate underneath the better.

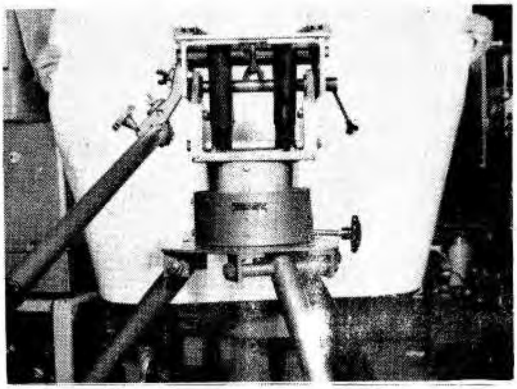
The legs of the tripod were made of 1½" Conduit tube with pieces of ¾" Conduit accurately aligned and tied through the end. Again tightly welded to the legs to stop side play. The three pieces of 1" square section steel tube approx. 2ft long with holes drilled right through at 3" spacings and a ¼" steel taper pin inserted in each. These extension legs I would advise be fitted into the main legs before fitting the Camera head, other than this there is a good chance of dropping the lot in the floor with disastrous consequences.

The final part is a skid to make the whole assembly rigid and moveable across the floor. The first ones used the large Shepherd castors with bolt fixing. These have proved rather a nuisance on some floors because of the small diameter ball. A rubber tyred castor similar to that used on hospital trolleys was found to be much more suitable.

The remainder of the skid assembly is simply 3 pieces of 1" steel square tube all approx 4ft long, sawn with mitred corners and welded together, to the top and bottom of these were welded triangular shaped 14g steel plates, the lower ones being drilled to suit the fixing arrangement of the castors. As an afterthought to stop the tripod getting the camera cable under the wheels or damaging it, some thin steel semi-circular buffer plates as in the photographs with ½" clearance off the floor. Also on top of the steel corner plates we welded some small steel uprights to stop the tripod legs from shooting out, again the form of these could be adapted to suit the leg/castor combination.

Two small details I have omitted to mention as regards the tilt assembly. On the diagram

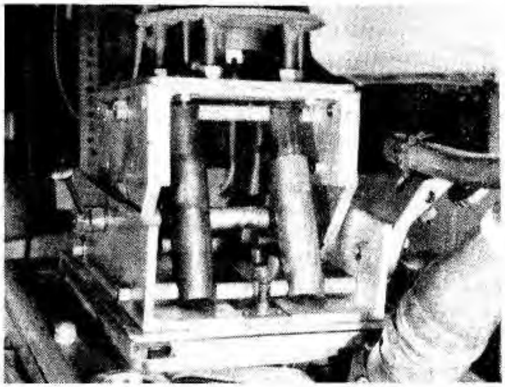


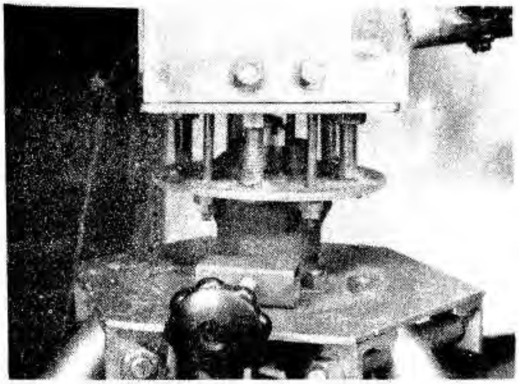


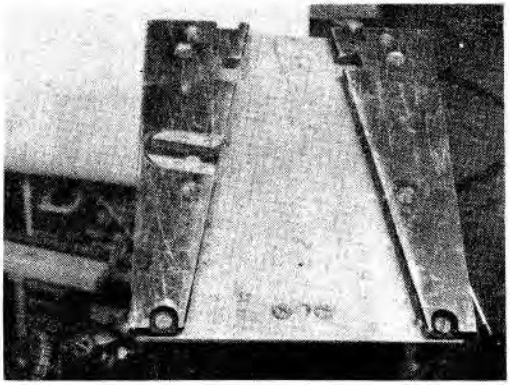
you will observe two hard rubber or fibre circular washers trapped between the top and bottom angle sections at both sides. This forms a damper or tilt locking device, the actual amount being varied by the tension applied to the tommy bar at the end of the $\frac{1}{2}$" threaded pivot rod.

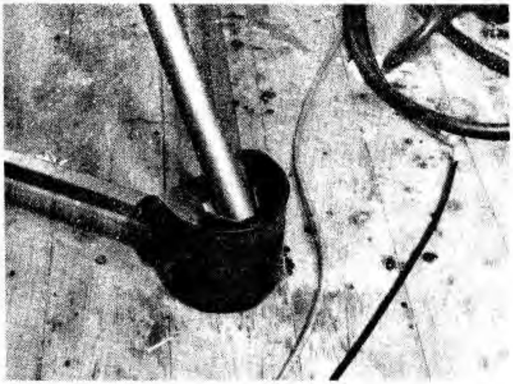
The last item is the fitting of the panning handle; this is not critical and can be varied to suit whatever type of tube is to hand. A smart appearance to the complete assembly was obtained by spraying all the separate pieces with a polychromatic quartz blue spray paint.

Finally I would like to thank my friend Dave Sharp for his untiring efforts in helping to obtain materials and assembly. Also John Lawrence and his draughtsman for helping to sort out and copying my basic drawings.









CIRCUIT NOTEBOOK No18

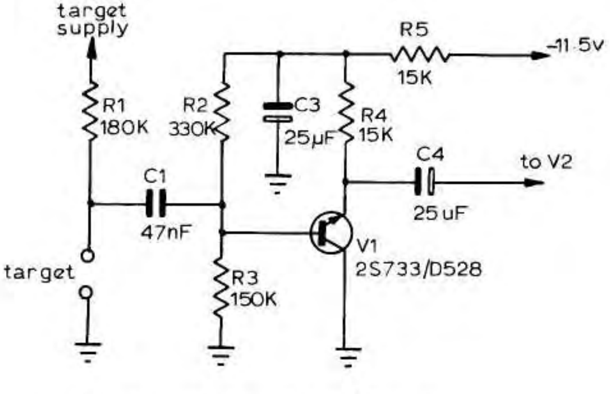
J. Lawrence GW6JGA'T

FITTING A FET TO THE PYE LYNX

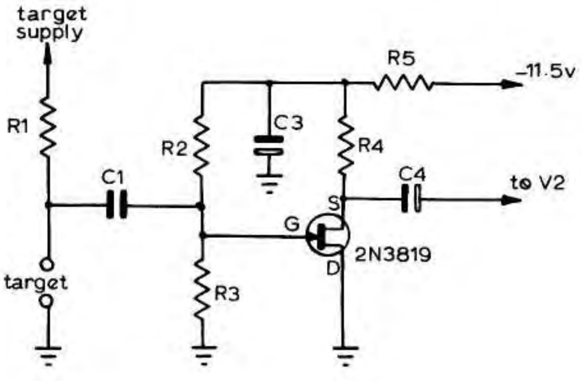
Recently, while looking for the cause of excessive head amplifier noise in a Pye Lynx camera, a FET substituted

Recently, while looking for the cause of excessive head amplifier noise in a PYE LYNX camera, a FET was substituted for the first transistor V1, as a replacement transistor was not available. Eventually the noise was traced to a noisy R2 and replacing this cleared the fault.

However, as the FET performed so well it was left in the circuit. No claims are made for its performance compared to the correct transistor but perhaps PYE LYNX owners might like to experiment with this arrangement.



Pye Lynx Video emitter follower



V1 replaced with 2N 3819 FET

1.2 KHz Active Bandpass Filter

This is based on a circuit given in the Burr-Brown "Handbook of Operational Amplifier Applications" and uses a 741 Op. Amp. The circuit could be used to replace the usual L.C. Filter used in an SSTV Receiver for extracting sync information from the video signal.

The circuit arrangement incorporates a "Twin Tee" notch filter in the negative feedback path of the Op. Amp.

At the tuned frequency of the Twin Tee, no negative feedback occurs and the gain rises to a high value.

The maximum gain is defined by R1 and Rf and adjustment of Rf enables the effective Q to be adjusted as shown in the table.

Calculated frequency $= \frac{1}{2 \times R \times C} = 1213$ Hz

Measured frequency = 1220 Hz

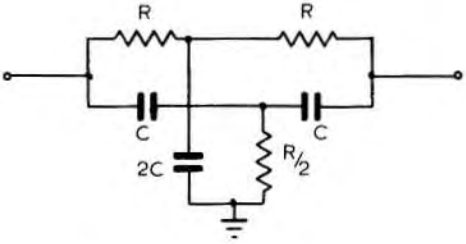
Measured Q

Rf	Q
330k	9
1M	26
2M	50

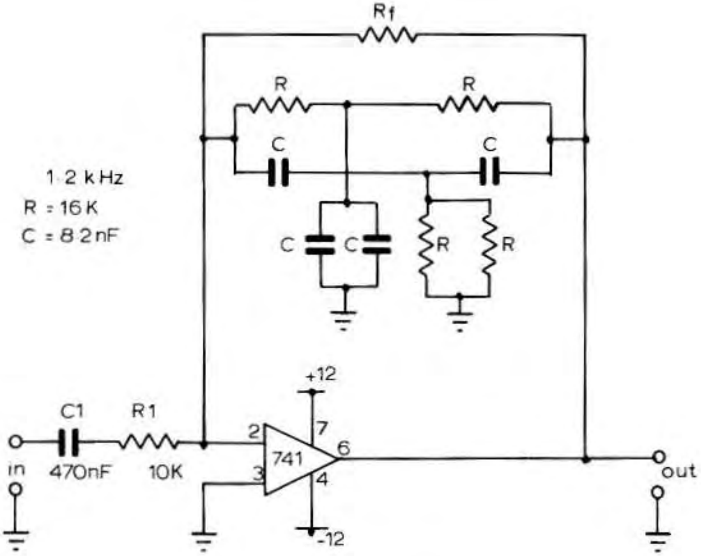
The Q is somewhat dependant on the matching of the components in the Twin Tee but using the Components specified a maximum Q of about 50 should be obtained.

The components used are 1% silver mica capacitors and 2% metal film resistors, giving a worst error of ± 3% or 36 Hz.

These components are listed as stock items in the RS components catalogue and should be readily obtainable.



Twin 'T' notch filter



Active band.pass filter

Reference.
"Handbook of Operational Amplifier Applications"
Selective Amplifier, Twin Tee feedback, Page 72
Burr-Brown International Ltd., 25a King Street
Watford WD1 8BT

Unfortunately this little handbook is now out of print and has been replaced by a bigger

and high priced volume entitiled:-
"Applications of Operational Amplifiers, Third Generation Techniques"
by Burr-Brown and McGraw-Hill £6.70
This could possible be obtained on loan by your local library.
Another useful reference on Op. Amps is:-
AN20 "Applications Guide for Op. Amps."
By National Semiconductors.
Available free from Athena Semicondoctor Marketing Co. Ltd.
140 High Street, Egham, Surrey.

continued from page 3

am the only person who has carried out continuous experiments, even during the war, on this subject, since 1928. Mr. Barton-Chapple and myself are two of the oldest members of the Royal Television Society. Having just retired from work I am now carrying out experiments and gathering notes for a book on the subject which I intend to write soon. Mainly I use 10, 15, 30 and 50 lines for monochrome and 20 lines for colour experiments, and I try to keep the picture ratio between 1:1 and 3:4, because the 7:3 ratio is very wasteful of the cone of light from the projector lamp, when using a disc transmitter. Three years ago I had good results from a photo-transistor plus two stages of transistor amplification, transformer coupled to a 2½ inch c.r.t. receiver, from a disc transmitter.

At the moment I am working on smaller and less expensive amplifiers that will still give good results. I have evolved a very versatile P.E.C. two valve pre-amplifier which gives a good start to any transmitting experiments as it can be used in several different modes.

H.J. Peachey M.R.T.S. A.M.A.S.E.E. T. Eng. (C.E.I.) M.I.T.E. London N.W. 9

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